## REMARKS

The present invention is a charging system, a charging device for a charging system, a portable device and a charging method. In accordance with an embodiment of the invention, a charging system comprises a charging device 105 which includes an induction core 107 which penetrates through a primary side coil 201 and a portable equipment 109 and/or 111 which includes an insertion portion 113 including an opening and containing a secondary side coil 205 which allows the induction core to pass therethrough.

Claims 1-8 stand rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent 5,923,544 (Urano). These grounds of rejection are traversed for the following reasons.

Each of the independent claims recites a charging system comprising a charging device, a charging device for a charging system or a portable equipment including an induction core which penetrates through a primary side coil and an insertion portion including an opening or an opening containing a charging arch containing a secondary side coil which combination is not taught by Urano.

Urano teaches an apparatus for charging a battery 33 contained within the body of a portable telephone 21 which is charged without contacts thereto through magnetic induction. As may be seen from Fig. 2B, the portable telephone 21 is inserted in a recessed port 32. In Figs. 1A, 1B, 2A and 2B, a secondary coil 28 is illustrated as being wrapped around a ferrite core 37 magnetically linked to a pair of outboard ferrite cores 37 around which respectively are wound a first transmitting coil

portion 26 comprised of coils NP1 and NP2 and a second power transmitting coil portion 27 around which are wrapped a pair of coils NP3 and NP4.

The operation of Urano is fundamentally different in that there is no induction core which penetrates through a primary side coil since the primary side coils NP1 and NP2 and NP3 and NP4 are permanently wound on the solid ferrite cores 37 as illustrated in Fig. 1B. The solid ferrite cores prevent the claimed passing of the induction core.

The portable telephone 21 carries the secondary ferrite core 37 around which secondary coils NS1 and NS2 are wound and are only magnetically linked to the primary coils permanently wound around the aforementioned ferrite cores when docked as illustrated in Fig. 1A. It is therefore seen that the portable telephone 21 does not include an insertion portion including an opening containing a secondary side coil which allows the induction core to pass therethrough. Instead, the secondary coils NS1 and NS2 are permanently wound on the second induction core 37 which does not constitute a secondary coil allowing the induction core to pass therethrough.

Accordingly, the subject matter of independent claims 1-3 is not anticipated by Urano in view of the recitation of insertion portion including an opening and an induction core which penetrates through a primary side coil and in which a secondary coil for performing charging is contained.

Independent claim 4 recites a charging device including a hook-shaped induction core which penetrates through the primary side coil and a portable equipment which includes an opening containing a charging arch containing a

secondary side coil and which allows the portable equipment to be suspensibly attached to the induction core. The induction core when the portable telephone 21 is docked in the port 32 is in line and therefore is not a hooked-shaped induction core. Furthermore, since the solid primary induction cores 37 have windings NP1, NP2, NP3 and NP4 permanently wound thereon, there is no penetration through the primary side coil. Moreover, the portable telephone 21 does not include an opening containing a charging arch containing a secondary side coil which allows the portable equipment to be suspensibly attached to the induction core. Claims 5 and 6 are similarly patentable for the reasons set forth above with respect to claim 4.

Claims 7 and 8 define a charging method for a portable equipment employing the charging system defined by claims 1 and 4, respectively. Claims 7 and 8 are also not anticipated for the reasons set forth above regarding claims 1 and 4. Moreover, Urano does not teach, as recited in claim 7, passing said induction core through said insertion portion and passing said induction core through said charging arch as recited in claim 8 since the docking of a portable telephone 21 involves insertion thereof into the port 32 which does not pass an induction core through an insertion portion or an arch since the secondary induction core is carried by the telephone device and the primary induction cores are solid with nothing physically passing through the primary or secondary cores. Moreover, claim 8 further recites holding said portable equipment suspensibly attached to said induction core for a predetermined time period which is not taught by Urano since the port 32 holds the portable telephone with the primary cores 37 being part of the port 32 and the

secondary induction core 37 being carried by the telephone does not meet the limitation of being suspensibly attached.

Claim 8 stands rejected under 35 U.S.C. § 103 as being unpatentable over Urano in view of U.S. Patent 5,678,207 (Williams, et al.). These grounds of rejection are traversed for the following reasons.

The Examiner, inconsistent with the rejection of claim 8 being anticipated by Urano, now states that Urano does not specifically teach a plane perpendicular to the ground and holding the portable equipments suspensibly attached. The Examiner cites Williams, et al. for a hang-up clip and a charging battery located within a wireless device which is perpendicular to the ground and hold[s] the portable equipment. However, while Williams, et al. do teach a hang-on battery charger 105, which is attached to a hang-up fastening assembly 131, there is no disclosure therein of passing the induction core through the charging arch. It is submitted Williams, et al. do not overcome the deficiencies of Urano noted above.

Moreover, if the proposed combination of Urano and Williams, et al. were made, the subject matter of claim 8 would not be obtained in view of the limitation of passing the induction core through the charging arch and further the deficiencies of claim 4 as discussed above regarding Urano. Moreover, the Examiner has not suggested any motivation why a person of ordinary skill in the art would be lead to modify Urano in view of Williams, et al. to arrive at the subject matter of claim 8. In this regard the mechanism of docking a portable telephone within the port 32 to effect charging of a battery 33 is fundamentally different than the attachment of a

hang-up vehicular charger 105 attached to a wireless microphone 103 as taught by Williams, et al.

In view of the foregoing amendments and remarks is it submitted that each of the claims in the application is in condition for allowance. Accordingly, early allowance thereof is respectfully requested.

If the Examiner believes that there are any other points which may be clarified or otherwise disposed of either by telephone discussion or by personal interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

To the extent necessary, Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to the Antonelli, Terry, Stout & Kraus, LLP Deposit Account No. 01-2135 (Docket No. 892.40310X00), and please credit any excess fees to such Deposit Account.

Respectfully submitted,

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# CHARGING SYSTEM FOR PORTABLE EQUIPMENT

## BACKGROUND OF THE INVENTION

### Field of the Invention

The present invention relates to a charging system, and more particularly to a charging system for portable equipment.

### Description of the Related Art

A ~~state where a~~ portable telephone ~~is~~ being charged by a prior-art contactless charging system based on electromagnetic induction, is shown in Fig. 3. The portable telephone 1 includes a secondary side coil 2, while a charger 3 includes a primary side coil 7. A user sets the portable telephone 1 on the charger 3 as shown in the figure and charges it for a predetermined time, period when the remaining battery capacity of the portable telephone 1 has become small, or when the portable telephone 1 is not used for a long time.

With the prior-art charging system as shown in Fig. 3, however, there is a spacing 5 between the primary side coil 7 and the secondary side coil 2, and induction cores 6 are kept apart, so that problems as mentioned below have been involved:

1. Since both the portable equipment and the charger need to include the cores made of a magnetic material such as metal, the weight and size of the portable equipment are increased.

2. Since the primary side coil and the secondary side coil are separate, even a very small deviation in the relative position between the coils exerts influence on a charging efficiency.

3. When a coin or an accessory article is accidentally held in the charger, ~~a~~the metal therein generates heat due to an induction current and forms ~~the~~a possible cause of a fire.

4. Since the charger is designed in adaptation to the geometries of the portable equipment, no charger can cope with ~~a plurality of sorts~~multiple types of portable equipment.

## SUMMARY OF THE INVENTION

The present invention has for its object to provide a charging system which solves the problems mentioned above, and which can cope with various ~~sorts~~types of portable equipment and can attain a stable charging efficiency.

According to the present invention, in order to accomplish the object, a charging system ~~of Claim 1 is characterized by comprising~~comprises a charging device which includes an induction core penetrating through a primary side coil, and a portable equipment which includes an insertion portion containing a secondary side coil and allowing ~~said~~the induction core to pass therethrough.

~~Besides, a charging device of Claim 2 is a~~A charging device for a charging system ~~having the charging device which~~ includes an induction core penetrating through a primary side coil, and a portable equipment which includes an insertion portion containing a secondary side coil and allowing the induction core to pass

therethrough, and ~~it is characterized by~~ comprising ~~said~~the primary side coil, and a power feed portion.

In addition, a portable equipment ~~of Claim 3 is characterized by~~ ~~comprising~~comprises an insertion portion through which an induction core of a charging device ~~as~~ penetrates through which a primary side coil thereof is allowed to pass, and in which a secondary side coil for performing charging is contained. Still in addition, a charging system ~~of Claim 4 is characterized by comprising~~comprises a charging device which includes a hook-shaped induction core penetrating through a primary side coil, and a portable equipment which includes a charging arch containing a secondary side coil and allowed to be suspensibly attached to ~~said~~the induction core.

Yet in addition, a charging device ~~of Claim 5 is a charging device for a charging system having the charging device which~~ includes a hook-shaped induction core penetrating through a primary side coil, and a portable equipment which includes a charging arch containing a secondary side coil and allowed to be suspensibly attached to the induction core, and ~~it is characterized by~~ ~~comprising~~comprises a power feed portion, ~~said~~the primary side coil, and ~~said~~the hook-shaped induction core.

Further, a portable equipment ~~of Claim 6 is characterized by~~ ~~comprising~~comprises a charging arch which is allowed to be suspensibly attached to a hook-shaped induction core of a charging device ~~as penetrates~~penetrating through a primary side coil thereof and which is provided at an end part of a body of the portable equipment, and a secondary side coil which ~~serves to perform~~performs

charging and which is contained in an annular space defined by ~~said~~the charging arch and a part under ~~said~~the arch.

Still further, a charging method ~~of Claim 7 is a charging method~~ for a portable equipment employing the charging system ~~of Claim 1, characterized by comprising the step of~~comprises installing ~~said~~the charging device; ~~the step of~~ passing ~~said~~the induction core through ~~said~~the insertion portion; and ~~the step of~~ holding ~~said~~the insertion portion and ~~said~~the induction core set for a predetermined time period.

Yet further, a charging method ~~of Claim 8 is a charging method~~ for a portable equipment employing, the charging system, ~~of Claim 4, characterized by comprising the step of fixing said~~ comprises fixing the charging device onto a plane perpendicular to the ground; ~~the step of~~ passing ~~said~~the induction core through ~~said~~the charging arch; and ~~the step of~~ holding ~~said~~the portable equipment suspensibly attached to ~~said~~the induction core for a predetermined time period.

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a view showing the state of the use of a charging system according to the present invention;

Fig. 2 is an enlarged view of the interior of the charging system according to the present invention; and

Fig. 3 is a view showing the state of the charging of a portable telephone in the prior art.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Now, an embodiment of the present invention will be described in detail with reference to Figs. 1 and 2.

Fig. 1 is a view showing ~~a state where~~ a charging system in ~~the~~an embodiment of the present invention ~~is~~as used, while Fig. 2 is an enlarged view of the interior of the charging system in the embodiment of the present invention.

As shown in Fig. 1, a wall 103 is erected perpendicularly to a floor 101 (the ground), and a charger body 105 in which a primary side coil 201 and a power feed portion 203 (shown in Fig. 2) are included is attached to the wall 103. An induction core 107 ~~stretches~~extends in the shape of a hook from the charger body 105, and penetrates through the primary side coil 201 inside the charger body 105. The induction core $107_1$ stretching from the charger body $105_1$ can suspend a portable telephone 109 and another portable equipment 111 through charging arches 113. Here, the charger body 105 includes a fixation member for fixing this body to the wall 103. The portable telephone 109 and the other portable equipment 111 are suspended from the induction core 107 as shown in Fig. 1 for a predetermined time period, whereby batteries built in the equipment 109 and 111 can be charged.

The interior of the portable telephone 109 in Fig. 1, as well as a charging device (211), is shown as an enlarged view in Fig. 2. A secondary side coil 205 is disposed on the side of the portable telephone 109, and it is connected with a rechargeable battery (the built-in battery) 207. The induction core 107 penetrates through the secondary side coil 205 as shown in Fig. 2. From this fact, it is

understood that the secondary side coil 205 exists in an annular space which is defined by the charging arch 113 shown in Fig. 1 and a part under this arch 113.

On the other hand, a dotted line 211 indicates part of the charging device which is included inside the charger body 105 in Fig. 1. The primary side coil 201 is connected with the power feed portion 203, and the induction core 107 is mounted so as to penetrate through the primary side coil 201. When an AC voltage is applied from the power feed portion 203 in this state, a magnetic flux is generated in the induction core 107, and a voltage is induced across the secondary side coil 205 by the action of electromagnetic induction, so that the charging of the battery 207 is initiated.

While the embodiment of the present invention has been described above, advantages listed below are brought forth by the present invention:

1. The portable equipment can be made smaller in size and lighter in weight.

2. Since the induction core extends from the primary side coil over to the secondary side coil, a stable charging efficiency can be attained by hanging the portable equipment on the charging hook.

3. It is not ~~apprehended by way of example~~feared that a small metal piece will accidentally enter the cradle portion of a charger, thereby to cause a fire.

4. The single charger can cope with the plurality of ~~sorts~~types of portable equipment, and can also charge a plurality of portable equipment simultaneously.

5. The charger is suited to the attachment on a wall surface, and the required space of the charging system can be saved.

6. A charging connection portion need not be provided unlike in conventional charging which employs electric contacts. Therefore, ~~it is facilitated to endow~~ the portable equipment may be endowed with a water-proof structure, and troubles such as the corrosion of the charging connection portion can be avoided.

Incidentally, the foregoing embodiment of the present invention has been described ~~on the case of~~as performing ~~the~~ charging ~~in the state~~ in which ~~the~~a charging arch is provided on ~~the~~a side of the portable equipment which is ~~suspensibly attached to the~~suspensibed from a hook-shaped induction core stretching from the charger body. However, charging may well be performed in such a way that a charger body is installed (or buried) ~~with~~within an induction core stretching perpendicularly from the ground (such as a floor), ~~and that~~with an insertion portion containing a secondary side coil ~~is set so as to pass~~passing the induction core therethrough, whereupon both the members (the induction core and the insertion portion) are held ~~set~~together for a predetermined time period.

~~Besides, the~~The foregoing embodiment of the present invention has been described ~~on the case of~~as mounting the charger body outside the wall, but it is obvious that the charger body may well be mounted inside the wall.

In addition, the foregoing embodiment of the present invention has been described as including the primary side coil, the power feed portion and the induction core as ~~the constituent~~ elements of the charging device, but it is obvious that any other ~~constituent~~ element may well be included in the charging device.

~~Yet in addition,~~While the foregoing embodiment of the present invention has been described ~~on the case of~~ for mounting the charging device on the wall in a

building, the charging device may be mounted, not only in the building, but also in an automobile by way of example.

In this manner, according to the present invention, a charging system capable of coping with various sorts of portable equipment and attaining a stable charging efficiency can be provided.